

Microsoft® Word for Windows™



Version: 6.0

Subject: **How to Optimize the Performance of Word 6.0**

Product Support Services

Application Note

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Introduction

Word 6.0 is larger and more robust than earlier versions of the application, so your computer has to work harder to run it. As a result, the performance of Windows, and therefore Word 6.0, may be slower. This Application Note describes how you can increase the operating speed of Word 6.0 for Windows when it is running under Microsoft Windows version 3.1 or Windows for Workgroups version 3.1 or 3.11.

If you optimize the performance of Windows, you will also speed up Word's performance. Optimizing Windows involves both your software (for example, the operating system version, memory-resident programs, fonts, and device drivers) and hardware (for example, processor type and speed, amount of memory, and available hard disk space). You can use this Application Note as a checklist to optimize both your software and hardware configurations for Word and other Windows-based applications running under Windows 3.1 or Windows for Workgroups 3.1 or 3.11. For more information about each topic in this Application Note, see your MS-DOS or Windows documentation.

If you are unfamiliar with a term used in this Application Note, see the glossary on page 14.

How to Optimize Word on a 386, 486, or Pentium™ Computer with 4 to 6 MB of RAM

To run Word 6.0, you must have at least 4 megabytes (MB) of RAM. As with most "minimum" requirements, 4 MB is not the optimal amount of memory to run Word. To optimally run Word 6.0, we suggest that you either add more RAM to your computer or optimize your existing RAM. Even with a 4-MB environment, however, you can almost always improve Word's performance by modifying your Windows and MS-DOS settings to free up additional memory.

Add More Memory

If you regularly work with large documents (50 pages and larger) or use many graphics in your documents, adding RAM will give you the most dramatic improvement in Word's operating speed. If your computer has 8 MB of RAM, Word will run faster, and you can also run another large application (such as Microsoft Excel) at the same time and interact with it from Word. On the other hand, if you work primarily with average-sized documents (50 or fewer pages) and don't use many graphics, the suggestions that follow should help increase Word's speed on your 4- to 6-MB computer.

Upgrade to MS-DOS Version 6.0 or Later

If you are running a version of MS-DOS earlier than version 6.0, you should upgrade to version 6.0 or later. Beginning with version 6.0, MS-DOS includes features (such as the **memmaker** and the **dos=high** commands) that help your computer use its memory more efficiently. Version 6.0 and later also offer enhanced hard-disk-management utilities (such as **scandisk** and **defrag**).

How to Make 4 MB Seem Like More RAM

The key to making Word run faster on a computer with 4 MB of RAM is to free up memory currently used by other operations that have little or no effect on Word's performance. Use the following three recommendations to make sure the maximum amount of RAM is available for Word to use. The first two recommendations optimize Windows, while the third recommendation specifically optimizes Word.

Important: We suggest that you implement all three of these recommendations, rather than trying only one or two. Of all the recommendations we subsequently make, these three will probably have the greatest impact on Word's performance. In fact, after you implement these three recommendations, Word may run fast enough that you won't want to further alter your configuration.

1. Increase Available Memory in the AUTOEXEC.BAT and CONFIG.SYS Files

This section discusses how you can use the EMM386 memory manager (EMM386.EXE) and SMARTDrive disk-caching program to increase available memory in your AUTOEXEC.BAT and CONFIG.SYS files. The EMM386 and SMARTDrive programs are supplied with both MS-DOS and Windows 3.1. Even if you use a third-party memory manager or disk-caching program, these instructions are still applicable, although your results may be somewhat different.

Note: Because both the Windows and MS-DOS Setup programs install EMM386 and SMARTDrive, be sure your AUTOEXEC.BAT and CONFIG.SYS files point to the latest versions. Use Windows File Manager or the MS-DOS **dir** command to check the file dates of the EMM386.EXE and SMARTDRV.EXE files, which are located both in your MS-DOS and Windows program directories. Make sure your AUTOEXEC.BAT and CONFIG.SYS files reference the newest version of each file. (Also be sure you are using the newest version of HIMEM.SYS.)

CONFIG.SYS

- a. On a 4-MB computer, it is important to give Windows access to as much RAM as possible. This means you should not configure any RAM as expanded memory or create a RAM disk in extended memory (using MS-DOS RAMDrive).

The EMM386.EXE memory manager should appear in your CONFIG.SYS file. EMM386 optimizes the use of conventional memory (640K) on your computer. Even Windows and Windows-based applications (which usually use extended memory) may sometimes use conventional memory, so you should maximize the available conventional memory for best results. The versions of EMM386 supplied with MS-DOS 6.0 and later do not allocate expanded memory until an operation needs it.

If you are running MS-DOS 6.0 or later, the EMM386.EXE command line is probably already present in your CONFIG.SYS file, so you may not need to add it. If you need to add it, use a command line similar to the following (where C:\DOS is assumed for the location of both your EMM386.EXE and HIMEM.SYS files):

```
device=c:\dos\emm386.exe
```

Note: Add the EMM386.EXE command line after the line that loads HIMEM.SYS. Both EMM386.EXE and HIMEM.SYS should be located in the same directory, and they should both be the most recent versions of the files. After you install EMM386.EXE, you should run the MS-DOS MemMaker program to correctly configure your computer's memory. For information about how to use MemMaker, see your MS-DOS documentation.

Special Note for MS-DOS Version 5.0

If you are running MS-DOS version 5.0, you may need to modify the EMM386.EXE command line in your CONFIG.SYS file so it does not create expanded memory. To do this, add the **noems** switch in place of the **ram** switch or a specific numeric switch. For example, replace **ram** or **1024** in the two lines below

```
device=c:\dos\emm386.exe ram x=C000-C7FF
```

```
device=c:\dos\emm386.exe 1024 x=C000-C7FF
```

so they appear as follows (you should not alter the other settings, such as the **x=C0000-C7FF** switch):

```
device = c:\dos\emm386.exe noems x=C000-C7FF
```

- b. If the RAMDrive (RAMDRIVE.SYS) command line appears in your CONFIG.SYS file, you should disable this command by typing the **rem** command at the beginning of the line, as shown in the following example:

```
rem device = c:\dos\ramdrive.sys
```

Note: On a computer with 16 MB or less of physical RAM, a RAM drive is not an efficient use of memory when you are running Windows.

AUTOEXEC.BAT

The only line you need to check in your AUTOEXEC.BAT file is the SMARTDrive (SMARTDRV.EXE) command line. SMARTDrive is an MS-DOS and Windows utility that creates a cache in extended memory so that it can store information it reads from your hard disk. SMARTDrive improves your computer's performance because an application can access information in memory faster than it can access the same information on a hard disk.

Depending on which version of MS-DOS you are running, the SMARTDRV.EXE command line includes one or two numbers. The first number—the **InitCacheSize** parameter—specifies (in kilobytes) the cache size when Windows is not running. The second number—the **WinCacheSize** parameter—specifies how much of the cache Windows can use when it is running.

On a 4-MB computer, for all versions of MS-DOS, you should set the SMARTDRV.EXE **WinCacheSize** (or second) parameter to **320**, as shown in the following example:

```
c:\dos\smartdrv.exe 2048 320
```

Note: Windows for Workgroups may set the **WinCacheSize** parameter to 128 instead of 320. If you are running Windows for Workgroups, you should not change this number because Windows for Workgroups uses a specialized disk-caching utility.

By default, when you are running MS-DOS 6.0 or later, the SMARTDRV.EXE command line does not include any parameters. On a 4-MB computer, you should add the **2048 320** parameters, as shown in the sample above.

2. Create a Permanent Swap File

Windows frees memory and speeds up performance by swapping information from memory to a swap file on your hard disk. The swap file, also known as virtual memory, acts like additional RAM on your computer. You still need at least 4 MB of physical RAM to run Word, but if you use virtual memory, you can open and edit files that are too large to fit in 4 MB of RAM, and you can run more than one application at a time. (For example, you may be able to run Word and Microsoft Excel at the same time.)

In Windows, you can create two types of swap files. For more information about swap files, see the glossary on page 14.

How to Create a Permanent Swap File in Windows

1. At the end of this procedure, you will restart Windows or your computer, so make sure you close any running applications now.
2. In Windows Control Panel (usually located in the Main group in Windows Program Manager), choose the 386 Enhanced icon.
3. In the Enhanced dialog box, choose the Virtual Memory button.

4. Under Swapfile Settings, if the Type setting is Permanent, choose the Cancel button and skip to recommendation 3, "Modify the WINWORD6.INI File," on page 5 of this Application Note. If the Type setting is None or Temporary, choose the Change button.
5. Under New Swapfile Settings, select Permanent in the Type list.
6. The Recommended Maximum Size setting, which also appears in the New Size box, is usually the optimal setting. If the Recommended Maximum Size is "12,000 KB" (12 MB) or larger, you can decrease the New Size setting as low as **12,000**.
7. If the Use 32-Bit Disk Access option is available at the bottom of the Virtual Memory dialog box, you can select it to further increase your Windows operating speed. This setting is not required to create a permanent swap file.

Note: You should not select the Use 32-Bit Disk Access option if power-management utilities are installed on your computer. Power-management utilities are often included on laptop (portable) computers and the new "green machines."

8. If you are running Windows for Workgroups 3.11 or later, select the Use 32-Bit File Access option and select or type **320** in the Cache Size box.
9. Choose OK. If Windows prompts you to restart your computer or Windows, choose to restart.

3. Modify the WINWORD6.INI File

To increase bitmap-redrawing speed and scrolling speed in Word, you can use the instructions below to add **BitMapMemory** and **CacheSize** settings to the [Microsoft Word] section of your WINWORD6.INI file, which is located in your Windows program directory (usually, C:\WINDOWS). You should quit all sessions of Word before you begin these procedures.

BitMapMemory

If your documents often contain many graphics, you should skip this section, as it could actually make Word run more slowly. Otherwise, by modifying the **BitMapMemory** setting, you can free up some of the memory (up to 512K) Word reserves to work with bitmapped graphics so Word can use it for other operations. (For more information about bitmaps, see the glossary on page 14.) The default **BitMapMemory** size is 1024K (1 MB).

Note: This setting has no effect on the speed of accessing or displaying vector graphics such as .WMF, .CGM, .WPG, .DRW, and .CDR files.

Do the following to add the **BitMapMemory** setting to your WINWORD6.INI file:

- a. In Windows Program Manager, choose Run from the File menu.
- b. In the Command Line box, type **winword6.ini** and choose OK. This opens your WINWORD6.INI file in Windows Notepad. The following is a sample of the beginning of a typical WINWORD6.INI file:

```
[Microsoft Word]
wphelp=0
user-dot-path=c:\winword6\template
workgroup-dot-path=c:\winword6\template
picture-path=c:\winword6\clipart
```

- c. On a new line, directly below the [Microsoft Word] line, type **bitmapmemory=512**, as shown in the following example:

```
[Microsoft Word]
bitmapmemory=512
wpHELP=0
user-dot-path=c:\winword6\template
workgroup-dot-path=c:\winword6\template
picture-path=c:\winword6\clipart
```

- d. Save the file and quit Notepad, then restart Word.
- e. If Word does not seem to run faster, or if Word runs more slowly, open your WINWORD6.INI file again using steps a and b above and remove the **BitMapMemory** setting. After you save and close your WINWORD6.INI file, you must quit and restart Word for this change to take effect.

CacheSize

The **CacheSize** setting defines the size of the internal Document Text cache in Word. The default **CacheSize** setting is 64K, which is also the minimum. If you frequently work with large documents, you can increase the **CacheSize** setting to reduce the frequency with which Word accesses your hard disk to retrieve parts of your document—thereby improving Word's performance. Because of memory constraints on a 4-MB computer, the maximum **CacheSize** setting you should use is 128K.

Do the following to add the **CacheSize** setting to your WINWORD6.INI file:

- a. Repeat steps a and b in the "BitMapMemory" section on page 5 to open your WINWORD6.INI file.
- b. On a new line, directly below the [Microsoft Word] line, type **cachesize=128**, as shown in the following example:

```
[Microsoft Word]
cachesize=128
bitmapmemory=512
WPHELP=0
```

- c. Save the file and quit Notepad, then restart Word.

What Else?

If you want to try to squeeze some extra speed out of Word or any other Windows-based application, take a look at the "Additional Tips for Improving Word for Windows Performance" section, which begins on page 8.

How to Optimize Word on a 386, 486, or Pentium Computer with at Least 6 MB of RAM

On a computer with at least 6 MB of RAM, Word 6.0 for Windows usually runs well, even if you make no changes to your Word or Windows configurations. If you have 6 MB or more of RAM, Word can make more use of memory and won't need to access the hard disk as frequently. Even so, you may still be able to improve Word's performance by making the following additional adjustments to your system.

Permanent Swap File

With a permanent swap file, Windows manages the memory on your computer more quickly. Without a permanent swap file, Windows often spends extra time on memory organization. Even if you have a lot of RAM (16 MB or more), you should use a permanent swap file. If you have more than 16 MB of RAM, you can create a small (1024K, or 1 MB) permanent swap file. To create a permanent swap file, use the instructions in the "How to Create a Permanent Swap File in Windows" section on page 4 of this Application Note.

WINWORD6.INI File

You can increase the **BitMapMemory** or **CacheSize** settings in your WINWORD6.INI file if you have at least 8 MB of RAM. To modify these settings, use the procedures in the "Modify the WINWORD6.INI File" section on page 5 of this Application Note. The "Modify the WINWORD6.INI File" section also contains a description of the **BitMapMemory** and **CacheSize** settings.

BitMapMemory

If your documents frequently contain many bitmapped graphics (such as scanned images and Windows screen captures), you can increase the redrawing and scrolling speed of bitmaps by increasing the amount of memory that Word reserves for these operations. On a computer with at least 8 MB of RAM, you can increase the **BitMapMemory** setting as high as 2048K (2 MB). The following sample WINWORD6.INI entry sets the **BitMapMemory** value at 2048K:

```
[Microsoft Word]
bitmapmemory=2048
```

CacheSize

If you primarily work with large documents, you can increase the **CacheSize** setting to enlarge Word's internal Document Text cache. With a larger cache, Word won't need to access the hard disk as frequently, which will speed up performance. Start by changing the **CacheSize** setting to 256K and then, if necessary, increase it to 1024K (1 MB). The following sample WINWORD6.INI entries set the **CacheSize** value at 256K and 1024K, respectively:

```
[Microsoft Word]
cachesize=256
```

```
[Microsoft Word]
cachesize=1024
```

***Note:** You may not need both the **BitMapMemory** and **CacheSize** settings, depending on the type of documents you usually create. If you change one of these settings and do not notice any improvement in Word's performance, delete the setting so that Word, Windows, and other applications can use the memory for other operations. You might find that Word's default settings already provide optimal performance.*

16 MB of RAM or More: Create a RAM Drive for Temporary Files

Windows frequently accesses the TEMP directory for many operations such as printing or converting files. For most computers, the **set temp** command in your AUTOEXEC.BAT file should point to a location on your hard disk with at least 5 or 6 MB of free disk space. (You will need more free disk space if you print many graphics.) However, if you follow the rules listed below, you may be able to improve your Word and Windows performance by using a RAM drive as your TEMP directory:

1. Use the RAMDRIVE.SYS file supplied with Windows for Workgroups 3.11 or MS-DOS 6.0 or later. Earlier versions of RAMDrive do not support RAM drives larger than 4 MB, which is too small for the TEMP directory you need to run Word.
2. The size of the RAM drive should be 6 to 8 MB. After you create the RAM drive, you should have at least 10 MB of available RAM—anything less hinders the performance of Windows. (This is why you need at least 16 MB of RAM in order to use a RAM drive as your TEMP directory.)

3. The **set temp** command should point to a subdirectory on the RAM drive—not to the root directory. This avoids the MS-DOS limitation on the number of files you can place in a root directory. For example, if your RAM drive is drive E, place the following lines (in the order listed) in your AUTOEXEC.BAT file:

```
md e:\temp
set temp=e:\temp
```

Note: If you have problems printing, importing graphics, or converting documents, remove the RAM drive and reset the **set temp** command to a directory on your hard disk.

For more information about creating a RAM drive, type **help ramdrive.sys** at the MS-DOS command prompt (MS-DOS version 5.0 or later).

Additional Tips for Improving Word for Windows Performance

General Speed Tips

Determine Whether Your TEMP Directory Should Be on a Compressed Drive

If you use a compression utility to compress your hard disk, you may wonder whether the TEMP directory should be located on a compressed drive. There is no easy answer to this question. Generally, if you have a fast computer, you will not notice any difference in performance when the TEMP directory is on a compressed drive. In fact, on a computer with an older, slower hard drive, you can sometimes *improve* performance by placing your TEMP directory on a compressed drive.

The only way to know for sure if your computer runs faster or slower with the TEMP directory on a compressed drive is to try it. Change the **set temp** command in your AUTOEXEC.BAT file, and see if you notice any performance difference (be sure to restart [reboot] your computer after you modify your AUTOEXEC.BAT file so that the changes can take effect).

Important! You must consider the following if you place your TEMP directory on an uncompressed drive:

Most uncompressed drives are very small. Any drive that the **set temp** command points to should have 6 MB or more of free disk space. If too little space is free, you may have problems with printing, converting documents, or creating new documents.

Run Fewer Programs in the Background

Every program you run—including terminate-and-stay-resident programs (TSRs)—consumes memory and processor power. The more programs you run at the same time under Windows, the greater the possibility that your computer may run slower. If you are running programs that you do not need for the work at hand, close them one at a time to see if they affect Word's performance. Once you determine the effect on Word, you can choose which programs to close to improve Word's performance.

Use the Right Video Driver for Faster Screen Display

You may not need the highest resolution video driver and the up to 16 million colors your video driver supports. Additional color support in your video driver can dramatically decrease the speed of screen updates when you scroll or update graphics. If you are writing reports and working with spreadsheets, you may need only 16 to 256 colors, so you can switch to a video driver that supports a lower resolution and fewer colors. You can always switch back if there is no change in performance or if your work requires additional video capabilities. Use the table below, which lists the memory "cost" of additional colors, to balance your performance needs with your display needs.

Colors	Memory cost
16	Base number (lowest cost)
256	2 times the memory/work of 16 colors
65K	4 times the memory/work of 16 colors
16 million	6 times the memory/work of 16 colors

Note: If you use one of the newest video cards that are designed to accelerate Windows, you may find that Windows runs just as fast with 16 million colors as with 256 colors.

Use Fewer Fonts

The more fonts you install in Windows, the slower Windows and Word start because both programs read the entire font list at startup. Furthermore, fonts use memory and file resources that Word needs to perform some complex projects. If your work sometimes requires the use of a large selection of fonts, consider using a font-organizing utility, such as the Microsoft Font Assistant, which is supplied with the Microsoft Word Assistant package. Font Assistant and other similar utilities group fonts together so you can activate or deactivate them in Windows as you need them. With Font Assistant, you can have a large font library, but Word's performance is affected only when you actually need to use the fonts.

Create a New Permanent Swap File

Sometimes, after long periods of use, Windows may run faster if you remove the existing permanent swap file and create a new one. If you notice that your Windows performance has degraded over time, use the following steps to regenerate your permanent swap file:

1. During this procedure, you will restart Windows or your computer, so you should close any running applications now.
2. In Windows Control Panel (usually located in the Main group in Windows Program Manager), choose the 386 Enhanced icon.
3. In the Enhanced dialog box, choose the Virtual Memory button.
4. Choose the Change button.
5. Under New Swapfile Settings, select None in the Type list, and then choose OK. Choose Yes when Windows asks if you are sure you want to make changes to virtual-memory settings.
6. In the dialog box that asks if you want to restart Windows or your computer, choose the Restart Windows or Restart Computer button.
7. After Windows restarts, repeat steps 1 through 3 to open the Virtual Memory dialog box.
8. Under New Swapfile Settings, select Permanent in the Type list.
9. If necessary, change the New Size setting, and then choose OK. Choose Yes when Windows asks if you are sure you want to make changes to virtual-memory settings.
10. In the dialog box that asks if you want to restart Windows, choose the Restart Windows button.

How to Print Faster

Many factors affect printing speed. Below is a short checklist of steps you can take that may help increase printing speed:

- Make sure your **set temp** command in your AUTOEXEC.BAT file points to a valid location on a drive with at least 6 to 8 MB of available disk space.
- If you print large documents that take several minutes to finish printing, disable any screen savers during the print job, or switch to the Blank Screen screen saver. Animated screen savers use computer processor time that you can allocate to your print job.
- If you print over a network, consult your network documentation to make sure your print server is working optimally.
- If you don't need to continue working while Word is printing, turn off the Background Printing option in Word. This option allocates processor time to Word during a print job so you can continue working, but this means less processor time is available for printing. To turn off Background Printing, choose Options from the Tools menu, select the Print tab, clear the Background Printing option, and then choose OK.

Appendix A—How to Edit Your AUTOEXEC.BAT and CONFIG.SYS Files

Make Backup Copies!

Before you modify your AUTOEXEC.BAT and CONFIG.SYS files, it is important that you make backup copies of them. If something goes wrong, or if you want to restore your original settings, you can use your backup files to restart (reboot) your computer. Use the following steps to make backup copies:

1. Choose the MS-DOS Prompt icon in Windows Program Manager to open an MS-DOS Prompt window.
2. At the command prompt, type the following and press ENTER:

c:

Note: In this procedure, it is assumed that drive C is the boot drive for your computer.

3. At the command prompt, type the following and press ENTER at the end of each line:

**cd **

copy config.sys config.xxx

copy autoexec.bat autoexec.xxx

exit

After you type **exit** and press ENTER, the MS-DOS Prompt window closes and you return to Windows.

Important! If you call Microsoft Product Support Services (PSS) for assistance while you edit your AUTOEXEC.BAT and CONFIG.SYS files, be sure to tell the support engineer the names of your backup files (that is, CONFIG.XXX and AUTOEXEC.XXX).

SysEdit: The Best Tool for Editing AUTOEXEC.BAT and CONFIG.SYS

Windows supplies an editing tool called SysEdit (System Configuration Editor) that automatically opens the key files that control your computer (including the AUTOEXEC.BAT and CONFIG.SYS files). Use the following instructions to run SysEdit:

1. In Windows File Manager or Program Manager, choose Run from the File menu.
2. In the Command Line box, type **sysedit**, and then choose OK.
3. Under Windows 3.1, SysEdit displays four files, including AUTOEXEC.BAT and CONFIG.SYS. Under Windows for Workgroups, SysEdit displays several additional files.
4. To activate the AUTOEXEC.BAT or CONFIG.SYS window, open the Window menu and choose the filename from the numbered list at the bottom of the menu.
5. As a routine precautionary measure, *before* you modify each file, choose Print from the File menu to print a copy of the file. If necessary, you can use this printed copy to quickly restore any of the original settings.
6. Edit your AUTOEXEC.BAT and CONFIG.SYS files as necessary. SysEdit works like other word processors such as Word for Windows or Windows Write.

Tip: Instead of deleting a line, type **rem** at the beginning of the line to disable the command. This makes it easy to undo changes later.

7. When you finish editing your AUTOEXEC.BAT and CONFIG.SYS files, save the files, then choose Exit from the File menu to quit SysEdit.

8. You must quit Windows and restart (reboot) your computer so the changes in your AUTOEXEC.BAT and CONFIG.SYS files can take effect.

Note: SysEdit always makes its own backup copy of any files you change, using the filename extension .SYD (for example, SysEdit saves CONFIG.SYS as CONFIG.SYD). However, SysEdit replaces existing .SYD files each time you modify a file, so you still need to make backup copies of your original system files using the method described in the "Make Backup Copies!" section on page 11 of this Application Note.

Using Backup Copies to Undo Changes

If you need to undo the changes you made to your AUTOEXEC.BAT or CONFIG.SYS files, use the following instructions to restore the backup copies you made in the "Make Backup Copies!" section on page 11 of this Application Note.

Important! This procedure completely reverses all the changes you made to both your AUTOEXEC.BAT and CONFIG.SYS files. It leaves no record of any of the modifications you made to either file.

1. Choose the MS-DOS Prompt icon in Windows Program Manager to open an MS-DOS Prompt window.
2. At the command prompt, type the following and press ENTER:

c:

Note: In this procedure, it is assumed that drive C is the boot drive for your computer.

3. At the command prompt, type the following and press ENTER at the end of each line:

**cd **

copy config.xxx config.sys

copy autoexec.xxx autoexec.bat

exit

After you type **exit** and press ENTER, the MS-DOS Prompt window closes and you return to Windows.

4. Exit Windows and restart (reboot) your computer so the settings in your restored AUTOEXEC.BAT and CONFIG.SYS files can take effect.

Appendix B—Rules for the Set Temp Command

The **set temp** command in your AUTOEXEC.BAT file defines the directory where your programs store temporary (.TMP) and "scratch" files. If the **set temp** command is not correct, you may have problems printing, converting, and even creating new Word documents. The following are two examples of valid **set temp** commands:

```
set temp=c:\temp
```

```
set temp=c:\windows\temp
```

Use the following checklist to make sure your **set temp** command is correct:

- ☒ There should be only *one* **set temp** command in your AUTOEXEC.BAT file. Delete all the "extras."

***Note:** If there is also a **set tmp** command in your AUTOEXEC.BAT file, that's okay—it can even point to the same directory as your TEMP directory. Some applications use the **set tmp** command to indicate where to store .TMP files.*

- There is only one space on the entire line, between the words **set** and **temp**.
- The directory listed after the equal sign (=) must exist.
- The directory listed after the equal sign (=) must not be the root directory of a drive. For example, **set temp=c:** is not a valid **set temp** command.
- The directory listed after the equal sign (=) must be on a drive with at least 6 MB of free disk space to ensure good performance under normal circumstances. Your Word and Windows operations may function properly with less free disk space, but sooner or later you will probably have problems with printing, converting, or creating documents. You should periodically delete old .TMP files from your TEMP directory to ensure there is always sufficient disk space.

***Note:** After you install the latest version of MS-DOS, you may find the following **set temp** command in your AUTOEXEC.BAT file:*

```
set temp=c:\dos
```

This is a completely valid setting, but you may want to change this to a different directory so your .TMP files don't get mixed up with your MS-DOS files. It's easier to delete .TMP files periodically if you store them in their own directory.

Appendix C—Glossary

AUTOEXEC.BAT A text file that contains a list of commands that your computer executes every time you start (boot) or restart (reboot) your computer.

bitmap A graphic made up of a collection of colored dots. The computer stores the graphic as one or more *bits* of information for each dot—hence the name *bitmap*. Some filename extensions for graphic files that are bitmaps include .PCX, .TIFF, .BMP, and .GIF.

cache A pool of memory set aside to store items from a slower device, such as a hard disk. By using a cache, your computer can retrieve often-used information much faster than if it were required to find it on the hard disk each time.

compressed drive A drive that has had its data compressed to take up less space. Special software must be running in the system to read from and write to a drive that is set up this way.

CONFIG.SYS A text file that contains a list of commands that MS-DOS executes every time you start (boot) or restart (reboot) your computer. The CONFIG.SYS file contains MS-DOS settings and drivers that run operations such as those pertaining to your network and devices such as your CD-ROM drive.

conventional memory The base RAM on your computer, typically the first 640K. Conventional memory is the only kind of RAM that MS-DOS-based applications can use, unless you use an expanded memory manager (EMM). *Compare* expanded memory, extended memory.

driver (Windows printer or video driver) Software that Windows loads at startup. Drivers give Windows specific instructions about your video card and printer that Windows and Windows-based applications use to display information on the screen and to print information on your printer.

expanded memory A type of physical RAM, up to 8 MB, usually used by MS-DOS-based applications that support its use. Windows does not use expanded memory. In Windows, if you run an MS-DOS-based application (such as Microsoft Word 6.0 for MS-DOS) that requires expanded memory, Windows emulates expanded memory (if you are running in standard mode, Windows uses the EMM386.EXE device driver to emulate expanded memory). The use of expanded memory is defined

by the Expanded Memory Specification (EMS). *Compare* conventional memory, extended memory.

extended memory Physical RAM beyond 1 MB, accessible when your computer is operating in protected mode (the mode that supports multitasking). Extended memory operates through a memory manager such as MS-DOS HIMEM.SYS. Windows uses extended memory. Extended memory is not typically available to MS-DOS-based applications except through a device driver such as EMM386.EXE. The use of extended memory is defined by the Extended Memory Specification (XMS). *Compare* expanded memory, conventional memory.

RAM Acronym for random access memory. This is the memory on semiconductor chips in your computer, not on the hard disk. The more RAM you have, the more programs you can run at the same time and the faster your programs may run.

reboot To restart a computer by reloading the operating system. You can reboot some computers by pressing the RESET button on the computer. On all computers, you can reboot by pressing CTRL+ALT+DEL on your keyboard (press all three keys at the same time). You should quit Windows before you reboot.

"scratch" file A file that an application creates to store work in progress. It is maintained by the application, usually without your knowledge. The application typically deletes the scratch file at the end of the session.

set temp A command in the AUTOEXEC.BAT file that tells programs where temporary files should be stored. (For more information, see Appendix B on page 13 of this Application Note.)

swap file A file Windows creates on your hard disk that it uses to swap information into and out of memory. Windows uses the swap file to create virtual memory. There are two types of swap files—permanent and temporary.

permanent swap file Windows creates this type of swap file only once, and the space it occupies on your hard disk is not available for any other purpose, even when Windows is not running. This is the only drawback to a permanent swap file; however, if you work primarily in Windows, the cost in hard-disk space is well worth the benefit of enhanced Windows performance. Unlike a temporary swap file, a permanent swap file does not change size as the free disk space on your

hard disk decreases. You *cannot* place a permanent swap file on a drive that has been compressed using a disk-compression utility.

temporary swap file Windows creates this type of swap file each time you start Windows and deletes it each time you quit Windows. The advantage of a temporary swap file is that you have more free disk space when Windows is not running. The drawback is that a temporary swap file is not as fast as a permanent swap file, and its size shrinks as the free space on your hard disk decreases. A temporary swap file is the only type you can place on a compressed drive.

***Note:** If you have sufficient disk space on an uncompressed drive, you should create a permanent swap file. It is worth the effort to reduce the size of your compressed drive to enlarge the uncompressed drive to create sufficient space for an optimally sized permanent swap file. Refer to your MS-DOS 6.0 or disk-compression utility documentation for more information about changing the size of a compressed drive.*

virtual memory Also called disk memory. Virtual memory is not in the RAM chips. It is space on the

hard disk that your computer uses as if it were RAM. With virtual memory, your applications can edit files that would otherwise be too large to fit in physical RAM. Windows uses temporary or permanent swap files to create virtual memory.

Windows for Workgroups 3.1 and 3.11 The versions of Windows that include built-in networking capabilities. Additionally, Windows for Workgroups 3.11 is enhanced so that it runs faster than earlier versions of Windows.